

Warranty Statement

U.S. General

★ **Air Superiority** ★

LIMITED WARRANTY

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for a period of two years from date of purchase.
(90 days if used by a professional contractor or if used as rental equipment).

This warranty does not apply to damage due directly or indirectly to misuse, abuse, negligence or accidents; repairs or alterations outside our facilities; or lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return the repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

3491 Mission Oaks Blvd. PO Box 6009 Camarillo, CA 93011 (800)444-3353

U.S. General

★ **Air Superiority** ★

30 GALLON

12.75 HP KOHLER

GAS ENGINE

AIR COMPRESSOR



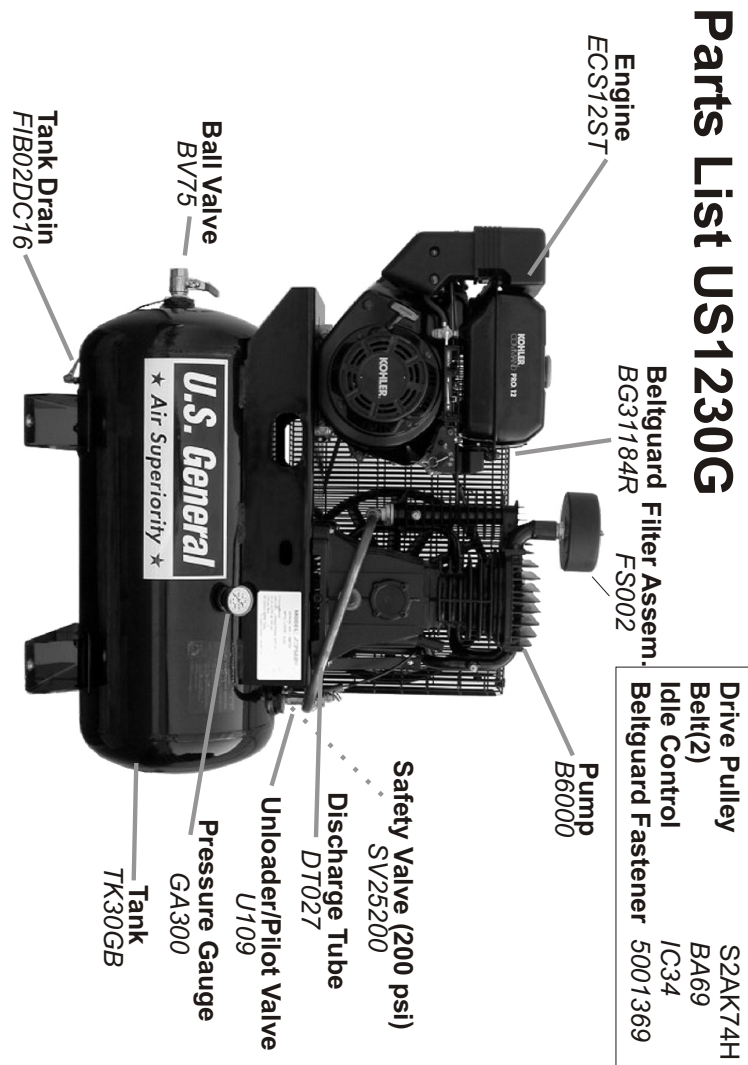
STOCK# 91824
OPERATOR'S MANUAL

⚠ WARNING

To reduce the risk of injury, the user must read and understand the Operator's Manual before using this product.

MODEL: US1230G

REV0905



Safety Instructions

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

Safety Signal Words

▲DANGER Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

▲WARNING Warning indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

▲CAUTION Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

NOTICE Notice indicates important information, that if not followed, may cause damage to equipment.

Before Using the Air Compressor

Since the air compressor and other components (pump, spray guns, filters, lubricators, hoses, etc.) used make up a high pressure pumping system, the following safety precautions must be observed at all times:

1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local safety codes as well as the United States Occupational Safety and Health Act (OSHA)
3. Only persons well acquainted with these rules of safe operation should be allowed to use the compressor.
4. Keep visitors away and NEVER allow children in the work area.
5. Wear safety glasses and use hearing protection when operating the pump or unit.
6. Do not stand on or use the pump or unit as a handhold.
7. Before each use, inspect compressed air system, fuel system and electrical components for signs of damage,



▲WARNING Never operate compressor without a beltguard. Compressors can start automatically without warning. Personal injury or property damage could occur from contact with moving parts.



9. Do not wear loose clothing or jewelry that will get caught in the moving parts of the unit.

▲CAUTION Compressor parts may be hot even if the unit is stopped.



Safety Instructions (continued)

10. Keep fingers away from a running compressor; fast moving and hot parts will cause injury and/or burns.

11. If the equipment should start to vibrate abnormally, STOP the engine/motor and check immediately for the cause. Vibration is generally a warning of trouble.

⚠ WARNING

NEVER refuel a running or hot engine. Explosive fuel can cause fires and severe burns. Avoid overfilling fuel tank.



12. Check fuel level before starting the engine. Do not fill the gas tank indoors. Wipe off any spilled gas before starting the engine.

⚠ DANGER

Gasoline vapor is highly flammable. Refill outdoors or only in well ventilated areas. Do not store, spill or use gasoline near an open flame or heat devices such as a stove, furnace, or water heater, which utilize a pilot light, or any device that can create a spark. If gasoline is accidentally spilled, move unit away from the spill area and avoid creating any source of ignition until gasoline vapors have dissipated.

⚠ WARNING

Motors, electrical equipment and controls can cause electrical arcs that will ignite a flammable gas or vapor. Never operate or repair in or near



a flammable gas or vapor. Never store flammable liquids or gases in the vicinity of the compressor.

⚠ WARNING

Carbon monoxide can cause severe nausea, fainting or death. Do not operate unit inside a closed building or a poorly ventilated area.



13. To reduce fire hazard, keep engine/motor exterior free of oil, solvent, or excessive grease.

⚠ WARNING

Never remove or attempt to adjust safety valve. Keep safety valve free from paint and other accumulations.

14. Do not tamper with governor setting on engine. Overspeeding the unit severely shortens engine life and may also be very hazardous.

⚠ DANGER

Never attempt to repair or modify tank! Welding, drilling or any other modifications will weaken the tank resulting in damage from rupture or explosion. Always replace worn or damaged tanks.

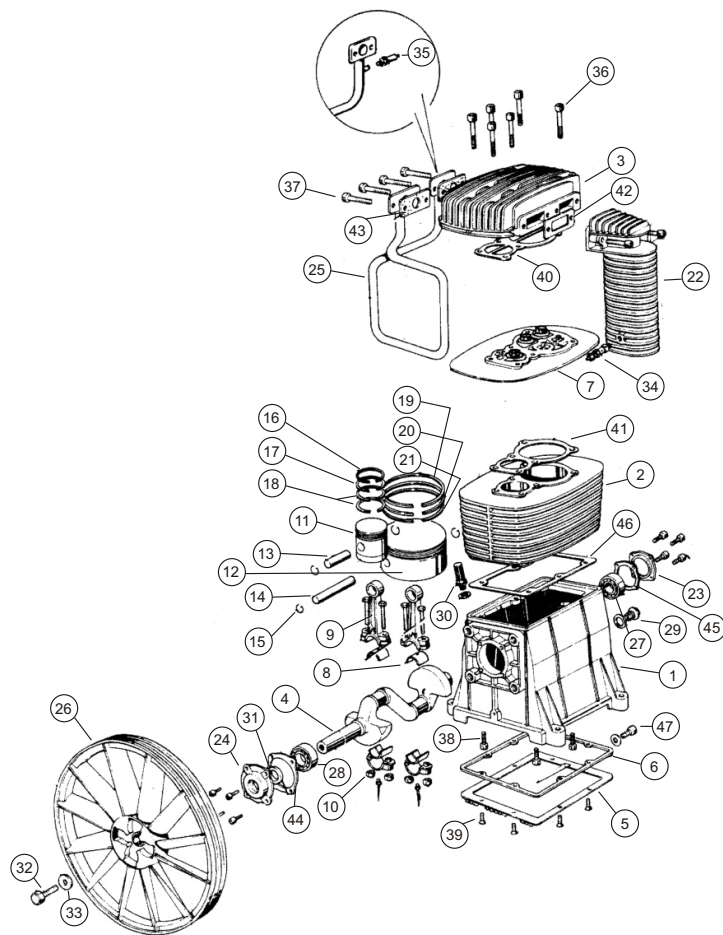


15. Tanks rust from moisture build-up, which weakens the tank. Make sure to drain tank daily and inspect periodically for unsafe conditions such as rust formation and corrosion.

1.	Crankcase	6061100
2.	Cylinder	6030000
3.	Head	6061401
4.	Crankshaft	6061200
5.	Crankcase Bottom	6061301
6.	Crankcase Bottom Gasket	6050101
7.	Valve Plate	6040051
8.	Conrod Bearing (2 per Rod)	9013014
9.	Connecting Rod	6011101
10.	Conrod Nut	9128234
11.	HP Piston	6021100
12.	LP Piston	6022100
13.	HP Wrist Pin	6021200
14.	LP Wrist Pin	6022200
15.	Circlip	9140060
16.	HP Ring	9020011
17.	HP Ring	9020041
18.	HP Ring	9020073
19.	LP Ring	9020016
20.	LP Ring	9020046
21.	LP Ring	9020076
22.	Aftercooler	5070100
23.	Bearing Housing (NDS)	5061690
24.	Bearing Housing (DS)	6061590
25.	Intercooler	5262010
26.	Flywheel	5000100
27.	Main Bearing	9170020
28.	Main Bearing	9170090
29.	Oil Sight Glass	9022003
30.	Oil Fill Plug	9024006
31.	Oil Seal	9163030
32.	Flywheel Bolt	9110024
33.	Flywheel Washer	9004009
34.	Aftercooler Safety Valve	Sv25225
35.	Intercooler Safety Valve	9049064
36.	Head Bolt	9101754
37.	Cooler Bolt	9101254
38.	Cylinder Bolt	9101324
39.	Crankcase Btm. Bolt	9114262
40.	Head Gasket	6050400
41.	Cylinder Gasket	6050300
42.	Aftercooler Gasket	5070200
43.	Intercooler Gasket	5050600
44.	Bearing Housing Gasket DS	6050500
45.	Bearing Housing Gasket NDS	5050500
46.	Frame Gasket	6050200
47.	Oil Drain Tube	9053201

Gasket Kit 6050057
Filter Assembly FS002
Filter Element FE001

B6000



16. Fast moving air will stir up dust and debris which may be harmful. Release air slowly when draining moisture or depressurizing the compressor system.

17. STOP the engine whenever leaving the work area, before cleaning, making repairs or inspections. When cleaning,

repairing or inspecting, make certain all moving parts have stopped. Disconnect the spark plug wire and keep the wire away from the plug to prevent accidental starting.

18. Allow engine to cool before storing.

Spraying Precautions

⚠ WARNING

Do not spray flammable materials in vicinity of open flame or near ignition sources including the compressor unit.



19. Do not smoke when spraying paint, insecticides, or other flammable substances.

20. Use a face mask/respirator when spraying and spray in a well ventilated

area to prevent health and fire hazards.

21. Do not direct paint or other sprayed material at the compressor. Locate compressor as far away from the spraying area as possible to minimize overspray accumulation on the compressor.

22. When spraying or cleaning with solvents or toxic chemicals, follow the instructions provided by the chemical manufacturer.

⚠ DANGER

Breathable Air Warning

This Compressor/pump is not equipped and should not be used "as is" to supply breathing quality air. For any application of air for human consumption, the air compressor/pump will need to be fitted with suitable in-line safety and alarm equipment. This additional equipment is necessary to properly filter and purify the air to meet minimal specifications for Grade D breathing as described in Compressed Gas Association Commodity Specification G 7.1 - 1966, OSHA 29 CFR 1910. 134, and/or Canadian Standards Associations (CSA).

DISCLAIMER OF WARRANTIES

In the event the compressor is used for the purpose of breathing air application and proper in-line safety and alarm equipment is not simultaneously used, existing warranties shall be voided, and The Manufacturer disclaims any liability whatsoever for any loss, personal injury or damage.

Glossary of Terms

ASME Safety Valve

A safety valve that automatically releases the air if the air receiver (tank) pressure exceeds the preset maximum.

PSI (Pounds per Square Inch)

Measurement of the pressure exerted by the force of the air. The actual psi output is measured by a pressure gauge on the compressor.

ACFM (Actual Cubic Feet per Minute)

Sometimes called CFM (Cubic Feet per Minute). Measurement of air volume delivered by the compressor at a given pressure..

Air Delivery

A combination of psi and SCFM. The air delivery required by a tool is stated as (number) SCFM at (Number) psi. The combination of these figures determines what size compressor is needed.

Regulator (Not Included)

A control that adjusts the line pressure to the proper amount needed to operate spray guns and air tools.

Tank Pressure Gauge

Indicates tank pressure in psi.

Unpacking and Checking Contents

1. Remove the air compressor from the carton.
2. Place the compressor on a secure, stationary work surface and look it over carefully.

▲WARNING

Do not operate unit if damaged during shipping, handling or use. Damage may result in bursting and cause injury or property damage.

▲WARNING

For your own safety, never operate unit until all assembly steps are complete and until you have read and understood the entire operator's manual.

▲WARNING

To reduce the risk of injury, if any parts are missing, do not attempt to assemble the air compressor until the missing parts are obtained and installed correctly.

Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Overheating	<ol style="list-style-type: none"> 1. Poor ventilation 2. Dirty cooling surfaces 3. Compressor undersized for application 	<ol style="list-style-type: none"> 1. Relocate the compressor to an area where an ample supply of cool, clean, dry and well-circulated air is available 2. Clean the cooling surfaces of pump and engine. 3. Check air requirements of tools
Unit stalls	<ol style="list-style-type: none"> 1. Low engine idle 2. Improper lubrication 3. Defective pilot/unloader valve 	<ol style="list-style-type: none"> 1. Increase idle, refer to engine manual for details 2. Check for proper oil level 3. Replace
Excessive noise	<ol style="list-style-type: none"> 1. Loose drive pulley or flywheel 2. Lack of oil in crankcase 3. Worn connecting rod 4. Worn wrist pin bushing 5. Worn bearings 6. Loose belts 	<ol style="list-style-type: none"> 1. Loose pulleys are a common cause of "knocking". Tighten appropriate bolts 2. Check for proper oil level 3. Replace 4. Remove piston assembly and replace necessary parts 5. Replace bearings and oil 6. Check for proper belt tension
Oil in the discharge air	<ol style="list-style-type: none"> 1. Wrong type or inferior grade of oil 2. Overheating 3. Restricted intake air 4. Worn piston rings 	<ol style="list-style-type: none"> 1. Change oil. Check oil recommendations on page 7 of this manual 2. See above section 3. Clean or replace air filter 4. Replace

Troubleshooting

⚠ WARNING

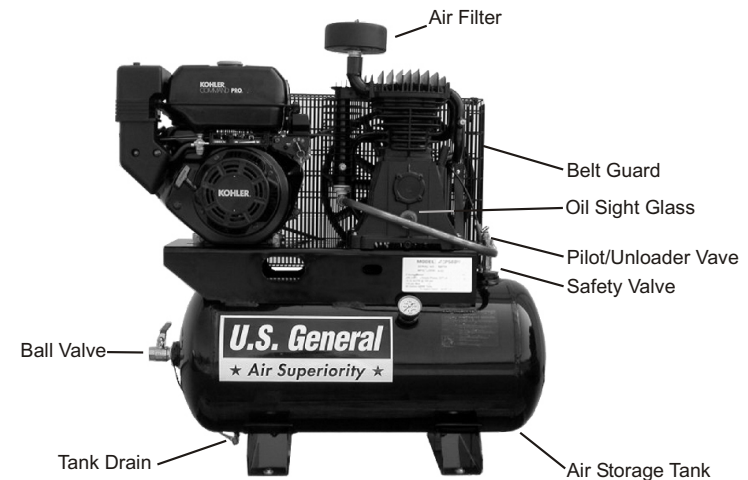
For your own safety do not try and run the air compressor while troubleshooting.

TROUBLE	PROBABLE CAUSE	REMEDY
Low discharge pressure	1. Air leaks	1. Listen for escaping air. Apply soap solution to all fittings and connections. Bubbles will appear at points of leakage. Tighten or replace leaking fittings or connections
	2. Leaking valves	2. Remove head and inspect for valve breakage, weak valves, scored valve plate, etc. Replace defective parts and reassemble
	3. Restricted air intake	3. Clean or replace air filter element.
	4. Blown gaskets	4. Replace and gaskets proven faulty on inspection
	5. Slipping belts	5. Loosen engine mounting bolts and move engine in a direction away from the compressor, being sure that the engine pulley is perfectly aligned with the flywheel. Tighten engine mounting bolts. Proper belt tension should not allow more than about ½ travel with less than 5 pounds of force

⚠ CAUTION

Be sure that the old head gasket is replaced with a new one each time the head is removed

Getting to Know Your Air Compressor



1. Belt Guard. The belt guard encloses the pulleys and drive belt. It protects the user from moving parts and directs cooling air to the compressor pump.
2. Air Filter. The air filter keeps dirt and debris from entering the compressor pump and reduces compressor noise.
3. Oil Sight Glass. The oil sight glass shows proper level and cleanliness of the oil. Oil level should show ½ full
4. Tank Drain Valve. The tank drain valve allows moisture to be removed from the tank.
5. Pilot/Unloader Valve. The pilot/unloader valve controls the engine rpm. When loaded, the engine will run at maximum operating speed and air will enter the tank. When compressor reaches maximum pressure, the engine will slow to an idle and air will vent to atmosphere.
6. ASME Safety Valve. This valve automatically releases air if the tank pressure exceeds the preset maximum.
7. Ball Valve. The ball valve allows unregulated outlet air with pressure up to 175 psi.
8. Air Storage Tank. The tank stores air for later use.
9. Regulator and Gauge (Not Included). Outlet air can be regulated by adjusting the regulator knob. Clockwise will raise outlet pressure and counterclockwise will lower outlet pressure. Outlet pressure will be displayed on gauge.
10. Tank Pressure Gauge. The tank pressure gauge will display air pressure in tank.

Operating Your Compressor

NOTICE

Before starting the compressor, thoroughly read all component instruction manuals, especially the engine manual.

All lubricated compressor pumps discharge some condensed water and oil with the compressed air. Install appropriate water/oil removal equipment and controls as necessary for the intended application.

NOTICE

Failure to install appropriate water/oil removal equipment may result in damage to machinery or workpiece.

Moisture in Compressed Air

Moisture in compressed air will form into droplets as it comes from an air compressor pump. When humidity is high or when a compressor is in continuous use for an extended period of time, this moisture will collect in the tank. When using a paint spray gun, this water will be carried from the tank through the hose, and out of the gun as droplets mixed with the spray material.

CAUTION

Do not attach air tools to open end of the hose until start-up is completed and unit checks OK.

NOTICE

To ensure proper operation, unit must be on a level surface.

IMPORTANT: This condensation will cause water spots in a paint job, especially when spraying other than water based paints. A filter in the air line, located as near to the gun as possible will eliminate most of this moisture..

Battery Connection

See Engine Manual for More Detailed Instructions

CAUTION

Make sure to follow instructions carefully to avoid a short and possible damage to the starter solenoid and/or battery. Always connect the positive (+) battery cable to the starter solenoid before connecting the negative (-) battery cable.

IMPORTANT: Number 2 wire or larger is recommended.

1. Locate the starter solenoid terminal. This is the top post farthest from the block with the small red wire..
2. Connect the positive (+) battery cable to the starter solenoid terminal.

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Start-Up

1. Turn the gas lever to the "On" position. Turn the choke lever to the left. Turn key to the "On" position, then to the "Start" position or pull start grip to start the engine. Once the engine is running, turn the choke lever to the original "right hand" position.

3. Connect the negative (-) battery cable to a mounting bolt or an acceptable engine ground connection.
4. Connect the positive (+) battery cable to the positive (+) battery terminal.
5. Connect the negative (-) battery cable to the negative (-) battery terminal.

Operating Your Compressor (continued)

2. This compressor is equipped with an automatic start- relief valve. This valve allows the unit to run (unloaded) for a few seconds before air pressure starts to build in the tank.
3. When maximum tank pressure is reached, the compressor automatically unloads, slowing the engine to idle. The engine remains at idle until tank pressure falls to a preset level. The engine will then accelerate and air will once again build pressure in the tank.
4. To turn off compressor, turn key to the "Off" position.

Note: Turn Gas Off when not in use.

Remember to drain moisture from tank daily.

Adjusting A Regulator (Regulator must be purchased Separately)

1. To adjust the regulator, pull out on the regulator knob. Turn regulator knob clockwise to raise outlet pressure and turn regulator knob counterclockwise to decrease outlet air pressure.
2. Once desired outlet pressure is obtained, push regulator knob in to lock setting.

Maintenance

WARNING

Disconnect spark plug and drain air system completely of all air pressure prior to performing maintenance on compressor..

NOTICE

Consult engine manual for scheduled maintenance instructions.

DAILY

1. Check oil level at sight glass. Check engine oil level.
2. Drain moisture from tank.
3. Visually check for loose parts or excessive noise or vibration.

WEEKLY

1. Inspect air filter. Replace if necessary.
2. Check safety valve by pulling ring and releasing. Valve should seal once released.
3. Clean excessive dirt/dust from unit..

MONTHLY

Check belt tension and alignment.

3 Months

Change Oil. A compressor grade non-detergent oil should be used.

Most automotive detergent oils cause excess carbon build-up and should not be used.

Cold climates (Below 30°F) use 20WT
Moderate Climates (30°F-90°F) use 30WT
Hot Climates (Above 90°F) use 40WT

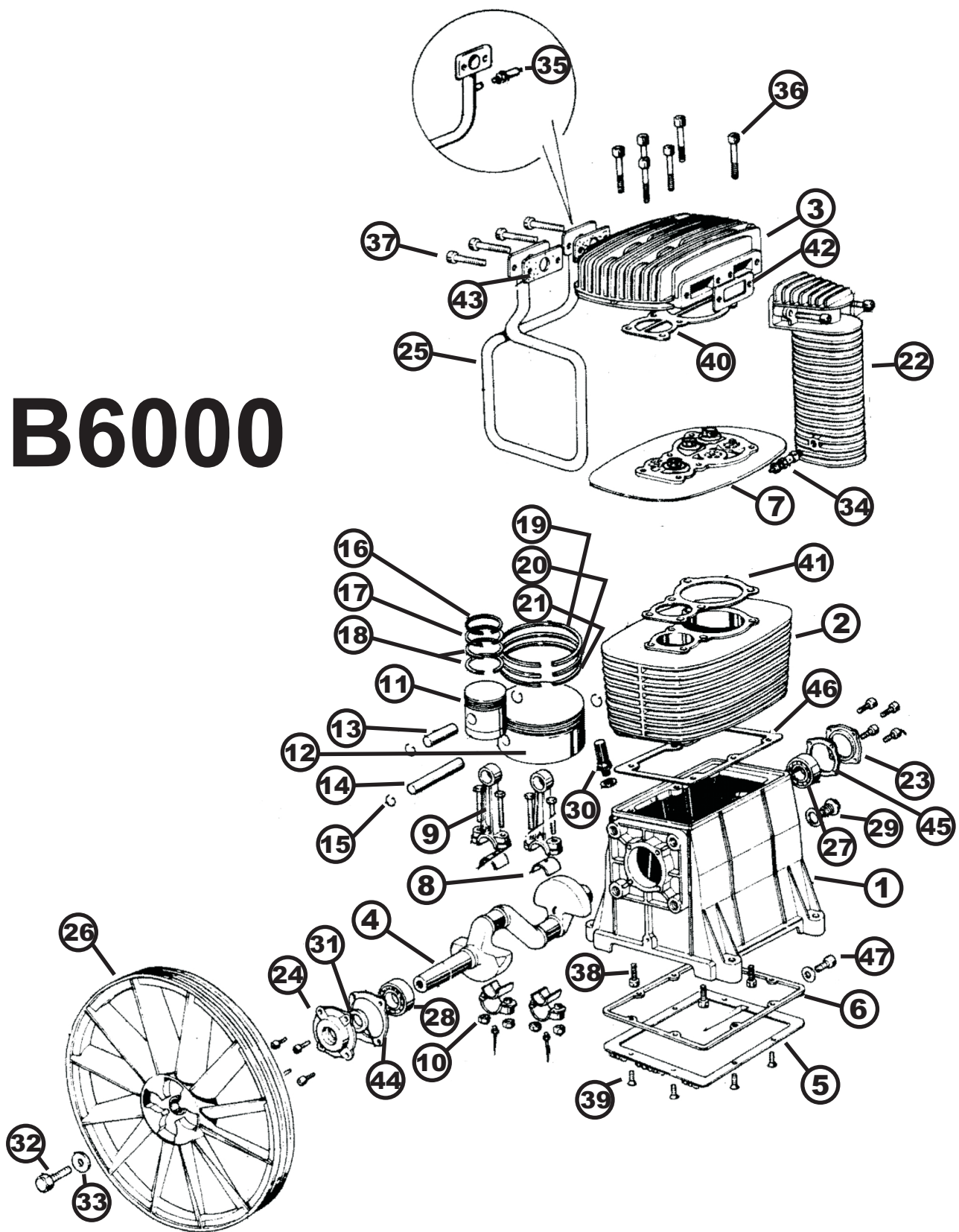
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Notes

B6000



B6000

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32.	Flywheel Bolt	9110024
33.	Flywheel Washer	9004009
34.	Aftercooler Safety Valve	SV25225
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45.	Bearing Housing Gasket NDS	5050500
46.	Frame Gasket	6050200
47.	Oil Drain Tube	9053201

Gasket Kit 6050057

Filter Assembly 6281007 or FS002

Filter Element 7081106 or FE001

OWNER'S MANUAL

COMMAND PRO CS SERIES 4-12 HP **HORIZONTAL CRANKSHAFT**



KOHLER.
engines

**BORN
TO RUN™**

Safety Precautions

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment owner's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



WARNING

Warning is used to indicate the presence of a hazard that *can* cause *severe* personal injury, death, or substantial property damage if the warning is ignored.



CAUTION

Caution is used to indicate the presence of a hazard that *will* or *can* cause *minor* personal injury or property damage if the caution is ignored.

NOTE

Note is used to notify people of installation, operation, or maintenance information that is important but not hazard-related.

For Your Safety!

These precautions should be followed at all times. Failure to follow these precautions could result in injury to yourself and others.



WARNING



Explosive Fuel can cause fires and severe burns.

Stop engine before filling fuel tank.

Explosive Fuel!

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.



WARNING



Rotating Parts can cause severe injury.

Stay away while engine is in operation.

Rotating Parts!

Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate the engine with covers, shrouds, or guards removed.



WARNING



Hot Parts can cause severe burns.

Do not touch engine while operating or just after stopping.

Hot Parts!

Engine components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the engine is running—or immediately after it is turned off. Never operate the engine with heat shields or guards removed.



CAUTION



Electrical Shock can cause injury.

Do not touch wires while engine is running.

Electrical Shock!

Never touch electrical wires or components while the engine is running. They can be sources of electrical shock.

California Proposition 65 Warning

Engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.



Safety Precautions (Cont.)

 WARNING

<p>Accidental Starts can cause severe injury or death.</p> <p>Disconnect and ground spark plug lead before servicing.</p>



Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

 WARNING

<p>Carbon Monoxide can cause severe nausea, fainting or death.</p> <p>Do not operate engine in closed or confined area.</p>

Lethal Exhaust Gases!

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.

 WARNING

<p>Explosive Gas can cause fires and severe acid burns.</p> <p>Charge battery only in a well ventilated area. Keep sources of ignition away.</p>

Explosive Gas!

Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present.

Congratulations – You have selected a fine four-cycle, single cylinder, air-cooled engine. Kohler designs long life strength and on-the-job durability into each engine...making a Kohler engine dependable...dependability you can count on. Here are some reasons why:

- Efficient overhead valve design and splash lubrication provide maximum power, torque, and reliability under all operating conditions.
- Dependable, maintenance free electronic ignition ensures fast, easy starts time after time.
- Kohler engines are easy to service. All routine service areas (like the oil fill/check plug, air cleaner, spark plug, and carburetor) are easily and quickly accessible.
- Parts subject to the most wear and tear (like the cylinder liner, crankshaft, and camshaft) are made from precision formulated cast iron. Because the cylinder liner can be rebored, these engines can last even longer.
- Every Kohler engine is backed by a worldwide network of over 10,000 distributors and dealers. Service support is just a phone call away. Call 1-800-544-2444 (U.S. & Canada) for Sales & Service assistance.

To keep your engine in top operating condition, follow the maintenance procedures in this manual.

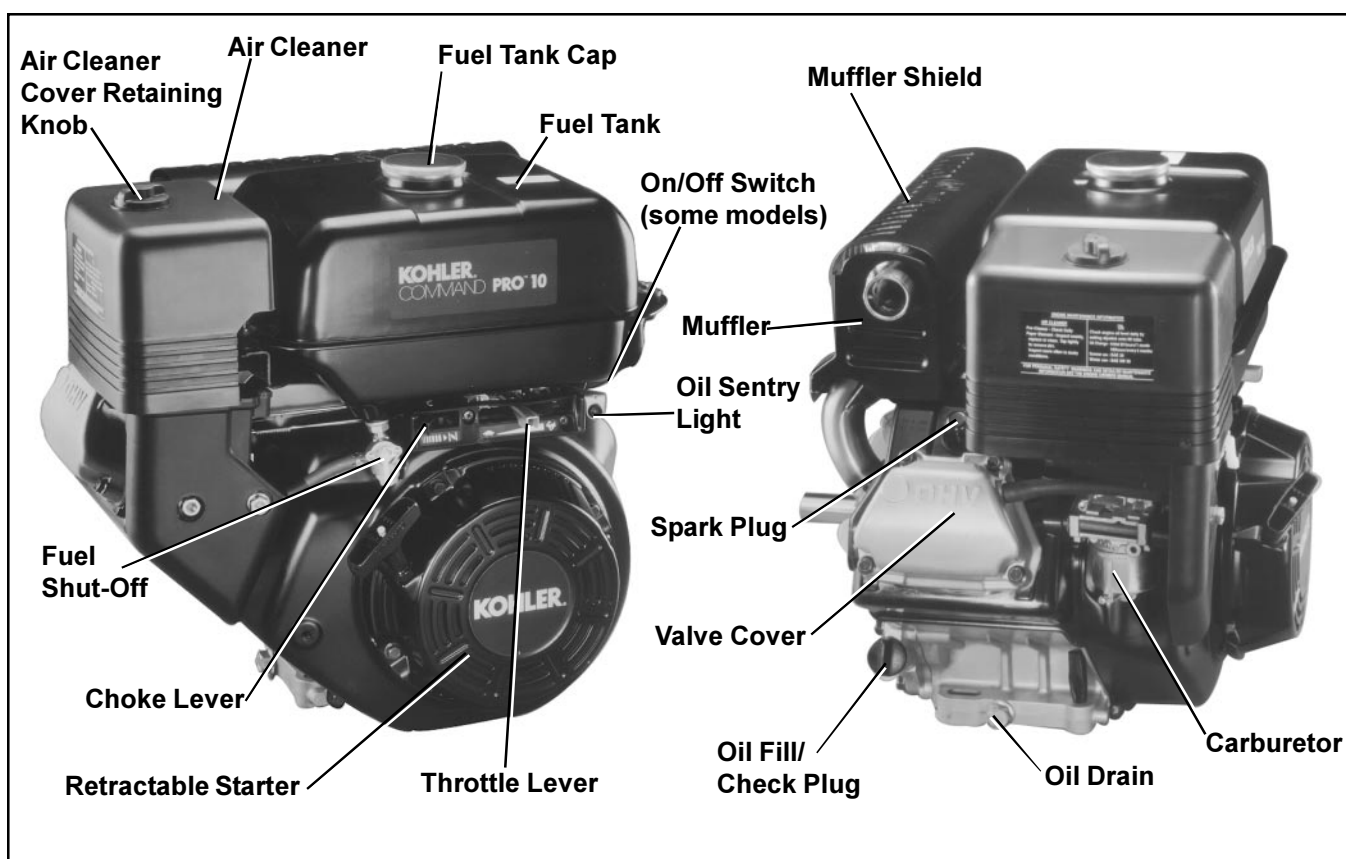


Figure 1. Location of Controls and Service Points on CS Engines.

Oil Recommendations

Using the proper type and weight of oil in the crankcase is extremely important. So is checking oil daily and changing oil regularly. Failure to use the correct oil, or using dirty oil, causes premature engine wear and failure.

NOTE: Using other than service class SG, SH, SJ or higher oil or extending oil change intervals longer than recommended can cause engine damage.

Oil Type

Use high quality detergent oil of **API (American Petroleum Institute) service class SG, SH, SJ or higher**. Select the viscosity based on the air temperature at the time of operation as shown in the following table.

A logo or symbol on oil containers identifies the API service class and SAE viscosity grade. See Figure 3.

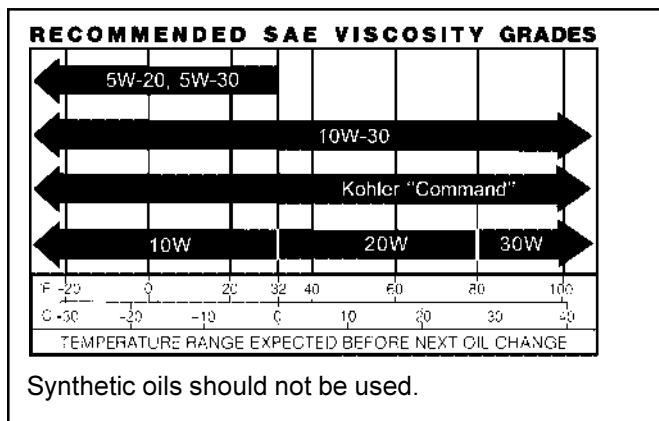


Figure 2. Viscosity Grades Table.



Figure 3. Oil Container Logo.

Refer to "Maintenance Instructions" beginning on page 8 for detailed oil check and oil change procedures.

Fuel Recommendations



WARNING: Explosive Fuel!

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.

General Recommendations

Purchase gasoline in small quantities and store in clean, approved containers. A container with a capacity of 2 gallons or less with a pouring spout is recommended. Such a container is easier to handle and helps eliminate spillage during refueling.

Do not use gasoline left over from the previous season, to minimize gum deposits in your fuel system and to insure easy starting.

Do not add oil to the gasoline.

Do not overfill the fuel tank. Leave room for the fuel to expand.

Fuel Type

For best results use only clean, fresh, **unleaded** gasoline with a pump sticker octane rating of 87 or higher. In countries using the Research method, it should be 90 octane minimum.

Unleaded gasoline is recommended as it leaves less combustion chamber deposits. Leaded gasoline may be used in areas where unleaded is not available and exhaust emissions are not regulated. Be aware however, that the cylinder head will require more frequent service.

Gasoline/Alcohol blends

Gasohol (up to 10% ethyl alcohol, 90% unleaded gasoline by volume) is approved as a fuel for Kohler engines. Other gasoline/alcohol blends are not approved.

Gasoline/Ether blends

Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15% MTBE by volume) are approved as a fuel for Kohler engines. Other gasoline/ether blends are not approved.

Engine Identification Numbers

When ordering parts, or in any communication involving an engine, always give the **Model, Specification, and Serial Numbers** of the engine.

The engine identification numbers appear on a decal (or decals) affixed to the engine shrouding. Include letter suffixes, if there are any.

Record your engine identification numbers on the identification label below (Figure 4) for future reference.

THIS ENGINE CONFORMS TO U.S.
EPA PHASE 2 & 2002-2005
CALIFORNIA EMISSION CONTROL
REGULATIONS FOR SI SORE ENGINES

FAMILY _____
MODEL NO. _____
SPEC NO. _____
DISPL (CC) _____
SERIAL NO. _____

EMISSION COMPLIANCE PERIOD:
EPA: **CATEGORY A**

THIS ENGINE IS CERTIFIED TO
OPERATE ON: **GASOLINE**
REFER TO OWNERS MANUAL FOR
SAFETY, MAINTENANCE SPECS AND
ADJUSTMENTS. FOR SALES AND
SERVICE IN US/CANADA CALL:
1-800-544-2444

KOHLERengines
KOHLER CO. KOHLER, WI USA

(REF: _____)

N432

If your engine has this identification label, it is certified to meet EPA/CARB standards.

Figure 4. Engine Identification Label.

The Emission Compliance Period referred to on the Emission Control or Air Index label indicates the number of operating hours for which the engine has been shown to meet Federal and CARB emission requirements. The following table provides the Engine Compliance Period (in hours) associated with the category descriptor found on the certification label.

Emission Compliance Period (Hours)

EPA	Category C 250 Hours	Category B 500 Hours	Category A 1000 Hours
CARB	Moderate 125 Hours	Intermediate 250 Hours	Extended 500 Hours

Refer to certification label for engine displacement.

Exhaust Emission Control System for models CS4-12 is EM.

Operating Instructions

Also read the operating instructions of the equipment this engine powers.

Pre-Start Checklist

NOTE: This engine has been shipped without engine oil. Fill with oil, otherwise it will not start.

- Check oil level. Add oil if low. Do not overfill.
- Check fuel level. Add fuel if low.
- Check cooling air intake areas and external surfaces of engine. Make sure they are clean and unobstructed.
- Check that the air cleaner components and all shrouds, equipment covers, and guards are in place and securely fastened.
- Check that any clutches or transmissions are disengaged or placed in neutral.



WARNING: Lethal Exhaust Gases!

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.

Cold Weather Starting Hints

1. Be sure to use the proper oil for the temperature expected. See Figure 2 on page 4.
2. Declutch all possible external loads.
3. Set speed control at part throttle position.
4. A warm battery has much more starting capacity than a cold battery.
5. Use fresh winter grade fuel. NOTE: Winter grade gasoline has a higher volatility to improve starting. Do not use gasoline left over from summer.

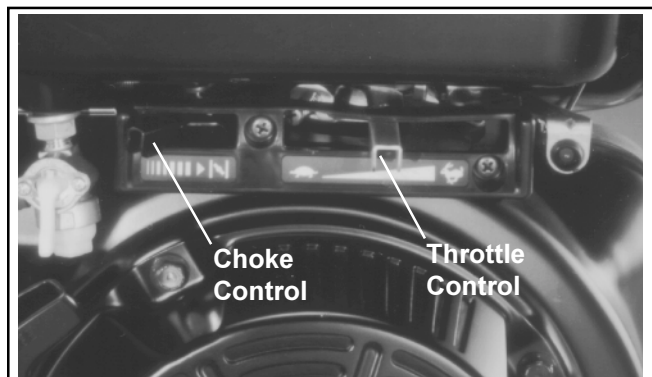


Figure 5. Control Panel.

Starting

1. Turn fuel shut-off valve to “on” position. See Figure 6.

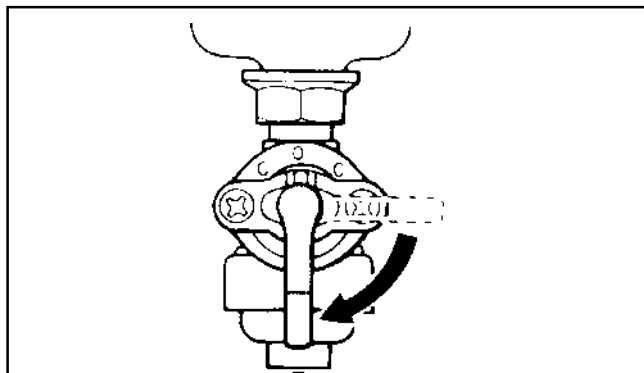


Figure 6. “On” Position of Fuel Shut-Off Valve.

2. **For a Cold Engine** – Place the throttle control **midway** between the “slow” and “fast” positions. See Figure 5. Place the choke control into the “on” position.

For a Warm Engine (normal operating temperatures) – Place the throttle control **midway** between the “slow” and “fast” positions. The choke is not required to start a warm engine.

3. Start the engine as follows:

For Retractable Start Engine – Turn engine On/Off switch to “on” (see Figure 7) and SLOWLY pull the starter handle until just past compression – STOP! Return starter handle, pull firmly with a smooth, steady motion to start. Pull the handle straight out to avoid excessive rope wear from the starter rope guide.

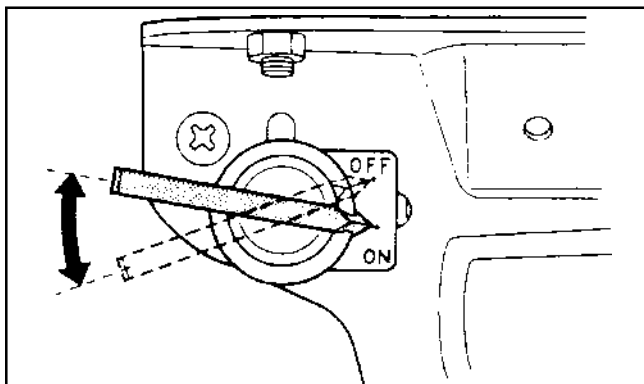


Figure 7. Retractable Start Engine On/Off Switch.

Extend the starting rope periodically and check its condition. If the rope is frayed, have it replaced immediately by your Kohler Engine Service Dealer.



WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

For an Electric Start Engine – Activate the starter switch. Release the switch as soon as the engine starts.

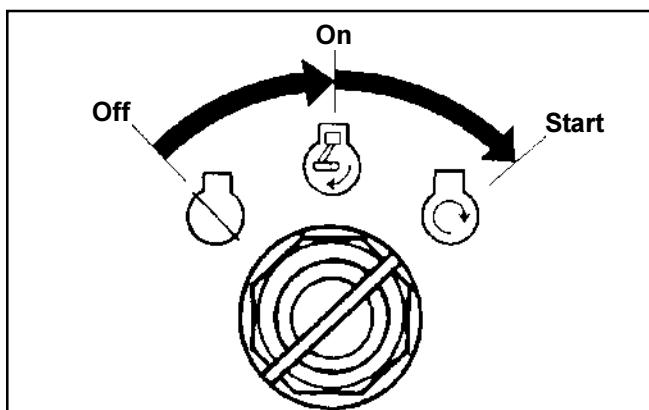


Figure 8. Electric Start Engine Starter Switch.

NOTE: Do not crank the engine continuously for more than 10 seconds at a time. If the engine does not start, allow a 60 second cool down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.

NOTE: If the engine develops sufficient speed to disengage the starter but does not keep running (a false start), the engine rotation must be allowed to come to a complete stop before attempting to restart the engine. If the start is engaged while the flywheel is rotating, the starter pinion and flywheel ring gear may clash, resulting in damage to the starter.

If the starter does not turn the engine over, shut off starter immediately. Do not make further attempts to start the engine until the condition is corrected. Do not jump start using another battery (refer to "Battery"). See your Kohler Engine Service Dealer for trouble analysis.

4. **For a Cold Engine** – Gradually return the choke control to the "off" position after the engine starts and warms up.

The engine/equipment may be operated during the warm up period, but it may be necessary to leave the choke partially on until the engine warms up.

Stopping

1. If possible, remove the load.
2. Move the throttle control to the "slow" or "low" idle position. Allow the engine to run at idle for 30-60 seconds.
3. Move the throttle control to the "slow" position. Turn key switch or on/off switch to "off" position.
4. Close fuel shut-off valve.

Battery

A 12 volt battery is normally used. Refer to the operating instructions of the equipment this engine powers for specific battery requirements.

If the battery charge is not sufficient to crank the engine, recharge the battery (see page 12).

Operating

Angle of Operation

This engine will operate continuously at angles up to 20°. Check oil level to assure crankcase oil is up to the point of overfilling the filler neck.

Refer to the operating instructions of the equipment this engine powers. Because of equipment design or application, there may be more stringent restrictions regarding the angle of operation.

NOTE: Do not operate this engine continuously at angles exceeding 20° in any direction. Engine damage could result from insufficient lubrication.

Cooling

NOTE: If debris builds up on the grass screen or other cooling air intake areas, stop the engine immediately and clean. Operating the engine with blocked or dirty air intake and cooling areas can cause extensive damage due to overheating.



WARNING: Hot Parts!

Engine components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the engine is running—or immediately after it is turned off. Never operate the engine with heat shields or guards removed.

Engine Speed

NOTE: Do not tamper with the governor setting to increase the maximum engine speed. Overspeed is hazardous and will void the engine warranty.

Maintenance Instructions

Maintenance, repair, or replacement of the emission control devices and systems, which are being done at the customers expense, may be performed by any non-road engine repair establishment or individual. Warranty repairs must be performed by an authorized Kohler service outlet.



WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

Maintenance Schedule

These required maintenance procedures should be performed at the frequency stated in the table. They should also be included as part of any seasonal tune-up.

Frequency	Maintenance Required
Daily or Before Starting Engine	<ul style="list-style-type: none">• Fill fuel tank.• Check oil level.• Check air cleaner for dirty, loose, or damaged parts.¹• Check air intake and cooling areas, clean as necessary.¹• Check fuel hose for cracks or damage. Replace if necessary.• Check exhaust system for leakage. Retighten or replace gasket if necessary.²• Check choke operation.• Check retractable starter operation.
Every 25 Hours	<ul style="list-style-type: none">• Service precleaner element. Replace if necessary.¹
Every 100 Hours	<ul style="list-style-type: none">• Change oil.• Replace air cleaner element.¹• Remove cooling shrouds and clean cooling areas.¹• Check all fittings and fasteners.• Clean fuel valve shut-off filter. Replace if necessary.• Check muffler screen/spark arrestor. Clean/replace if necessary.• Check spark plug condition, adjust gap, and clean. Replace if necessary.
Annually or Every 300 Hours	<ul style="list-style-type: none">• Check and adjust valve clearance when engine is cold.²• Check and adjust idle speed.• Service starter motor drive, if so equipped.²• Check cooling fan for damage.• Have combustion chamber decarbonized.²

¹Perform these maintenance procedures more frequently under extremely dusty, dirty conditions.

²Have a Kohler Engine Service Dealer perform this service.

Check Oil Level

The importance of checking and maintaining the proper oil level in the crankcase cannot be overemphasized. Check oil **BEFORE EACH USE** as follows:

1. Make sure the engine is stopped, level, and is cool so the oil has had time to drain into the sump.
2. To keep dirt, debris, etc., out of the engine, clean the area around the oil fill/check plug before removing it.
3. Unthread and remove the oil fill/check plug.
4. The level should be up to but not over, the point of overflowing the filler neck.

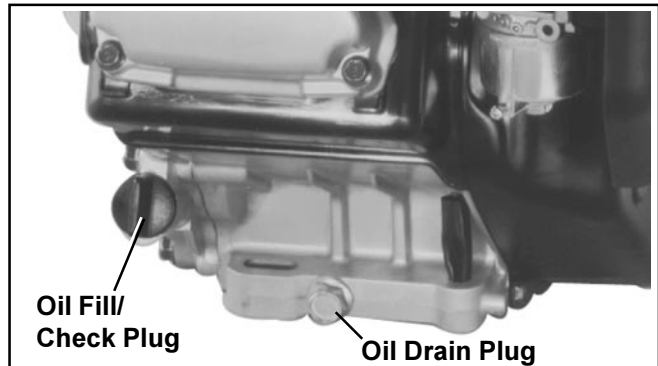


Figure 9. Location of Oil Drain and Check Plugs.

NOTE: Just because you can see oil in the crankcase doesn't mean the level is in the safe range. Bring the level up to the point of overflowing the filler neck.

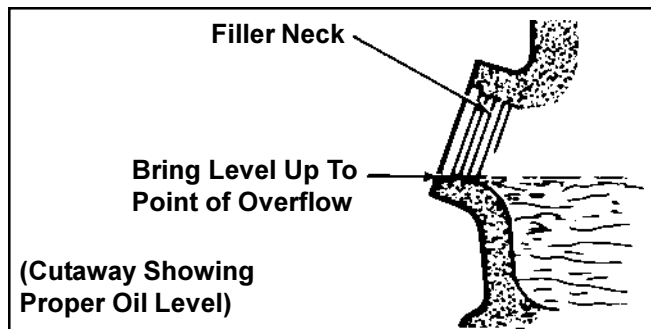


Figure 10. Proper Oil Level.

5. If the level is low, add oil of the proper type, up to the point of overflowing the filler neck. (Refer to "Oil Type" on page 4.) Always check the level before adding more oil.

NOTE: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level below the point of overflowing the filler neck.

Oil Sentry™

Engines are equipped with an Oil Sentry™ oil monitor. When the oil level falls below the safe level, the engine stops automatically. Unless you refill with oil, the engine will not start again. See Figure 11.

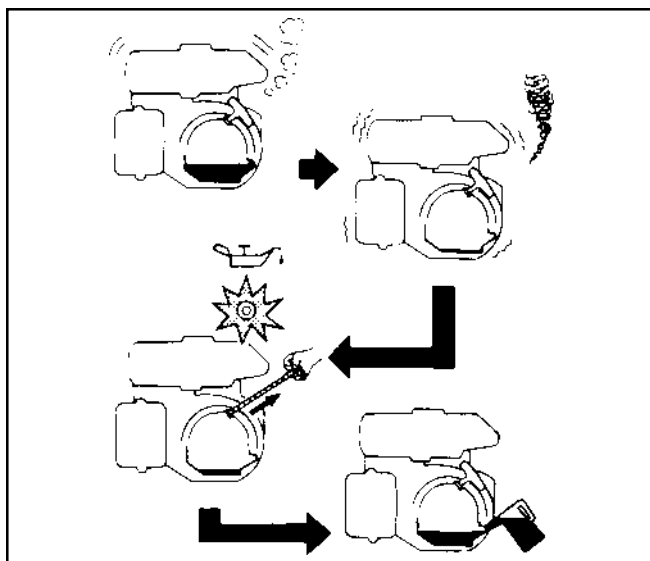


Figure 11.

NOTE: If the engine stalls or does not start, turn the engine switch to "on" position and then pull the recoil starter or attempt to start engine. If the oil warning light flickers for a few seconds, the engine oil is insufficient. Add oil and restart.

NOTE: Make sure the oil level is checked BEFORE EACH USE and is maintained up to the point of overflowing the filler neck.

Change Oil

For a new engine, change oil after the first **20 hours** of operation. Thereafter, change oil after every **100 hours** of operation.

For an overhauled engine, use **10W-30 – weight** service class SG, SH, SJ or higher oil for the first **20 hours** of operation. Change the oil after this initial run-in period. Refill with service class SG, SH, SJ or higher oil as specified in the "Viscosity Grades" table (Figure 2) on page 4.

Change the oil while the engine is still warm. The oil will flow freely and carry away more impurities. Make sure the engine is level when filling, checking, or changing the oil.

Change the oil as follows (see Figure 9):

1. To keep dirt, debris, etc., out of the engine, clean the area around the oil fill cap/dipstick before removing it.
2. Remove the oil drain plug and oil fill/check plug. Be sure to allow ample time for complete drainage.
3. Reinstall the drain plug. Make sure it is tightened to **17.6 N·m (13 ft. lb.)** torque.
4. Fill the crankcase, with new oil of the proper type, up to the point of overflowing the filler neck. Refer to "Oil Type" on page 4. Always check the level before adding more oil.
5. Reinstall the oil fill/check plug and tighten securely.

NOTE: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level below the point of overflowing the filler neck.

Reduction Systems

2:1 Reduction Systems

All 2:1 reduction systems are lubricated by the crankcase oil of the engine through special openings in the closure plate. No special maintenance or service is necessary. Check and maintain the oil level as outlined on pages 8 and 9.

6:1 Reduction Systems

CS4 and CS6: Use an internal pinion and ring gear system, independent of, and separated from the main crankcase lubrication. See Figure 12. Use the same weight oil in the reduction system that is being used in the crankcase. **Reduction System Capacity = .15 liters (5.07 fl. oz.).** Change the reduction system oil every 300 hours as follows:

1. Drain old oil out through the oil level/drain plug, tip engine as required.
2. Engine must be level. Fill with new oil through the oil fill plug hole on top until the oil level is up to the bottom of the oil level/drain plug hole. Reinstall both plugs securely.

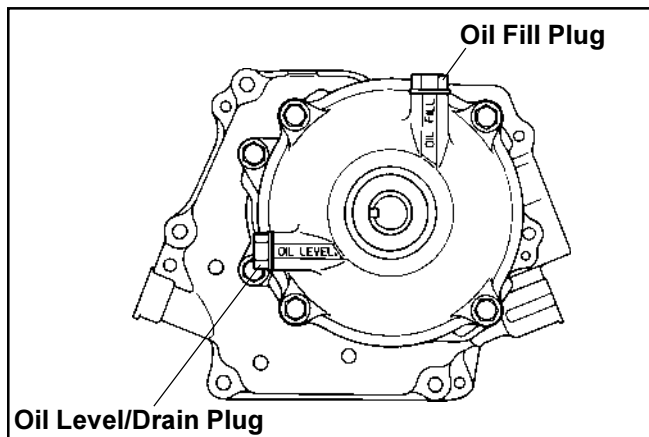


Figure 12. CS4 and CS6 6:1 Reduction System.

CS8.5, CS10, and CS12: Use a gear reduction system which is lubricated by the crankcase oil of the engine through holes in the closure plate. No special maintenance or service is necessary.

Service Precleaner and Air Cleaner Element

This engine is equipped with a replaceable, high density paper air cleaner element. All engines are also equipped with an oiled, foam precleaner which covers the paper element. See Figure 13 on page 11.

Check the air cleaner **daily or before starting the engine**. Check for a buildup of dirt and debris around the air cleaner system. Keep this area clean. Also check for loose or damaged components. Replace all bent or damaged air cleaner components.

NOTE: Operating the engine with loose or damaged air cleaner components could allow unfiltered air into the engine causing premature wear and failure.

Service Precleaner

Wash and reoil the precleaner every **25 hours** of operation (more often under extremely dusty or dirty conditions).

1. Remove the outer cover of the air cleaner assembly and access the element.
2. Remove the precleaner from the paper element.
3. Wash the precleaner in warm water with detergent. Rinse the precleaner thoroughly until all traces of detergent are eliminated. Squeeze out excess water (do not wring). Allow the precleaner to air dry.
4. Saturate the precleaner with new engine oil and squeeze out all excess oil.
5. Reinstall the precleaner over the paper element.
6. Reinstall and secure the air cleaner cover.

Service Paper Element

Every **100 hours** of operation (more often under extremely dusty or dirty conditions), replace the paper element.

1. Remove the outer cover of the air cleaner assembly and access the element/precleaner assembly. Remove the wing nut securing the element assembly, or pull the complete assembly out of the cover/housing (some Heavy Duty Air Cleaners). Separate the precleaner from the element and service as outlined above.
2. Do not wash the paper element or **use pressurized air**, as this will damage the element. Replace a dirty, bent, or damaged element with a genuine Kohler element. Handle new elements carefully; do not use if the sealing surfaces are bent or damaged.
3. When servicing the air cleaner, check the air cleaner base. Make sure it is secured and not bent or damaged. Check the air cleaner cover/housing for damage or improper fit. Replace all bent or damaged air cleaner components.

On Standard Air Cleaner Systems:

Before air cleaner is reassembled make sure rubber seal is in position around stud. Inspect seal and replace if its condition is questionable in any way.

On Heavy Duty Air Cleaner Systems:

Remove and clean the lower dirt/swirl chamber. Make sure the openings near the base of chamber and in the air cleaner cover/housing, are not blocked or restricted. See Figure 13.

4. Position the paper element on base and secure with wing nut, then install the precleaner over the element. If element is not secured with a wing nut, place the precleaner over the element and install it as an assembly into the cover/housing. Narrow end must be installed first and face away the from base.
5. Reinstall and secure the outer cover/housing.

Clean Air Intake/Cooling Areas

To ensure proper cooling, make sure the grass screen, cooling fins, and other external surfaces of the engine are kept clean **at all times**.

Every **100 hours** of operation (more often under extremely dusty, dirty conditions), remove the blower housing and other cooling shrouds. Clean the cooling fins and external surfaces as necessary. Make sure the cooling shrouds are reinstalled.

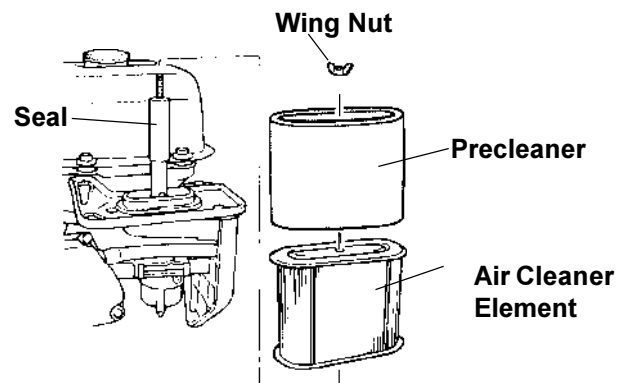
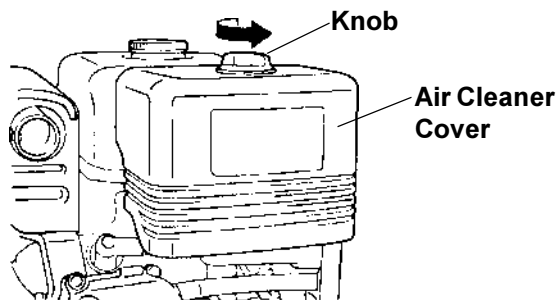
NOTE: Operating the engine with a blocked grass screen, dirty or plugged cooling fins, and/or cooling shrouds removed, will cause engine damage due to overheating.

Ignition System

This engine is equipped with a dependable electronic magneto ignition system. Other than periodically checking/replacing the spark plug, no maintenance, timing, or adjustments are necessary or possible with this system.

In the event starting problems should occur which are not corrected by replacing the spark plug, see your Kohler Engine Service Dealer for trouble analysis.

Standard Dual Air Cleaner System



Heavy Duty Air Cleaner System

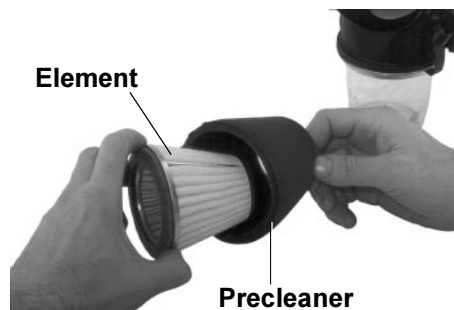


Figure 13. Air Cleaner System Components.

Check Spark Plug

Annually or every **100 hours** of operation, remove the spark plug, check condition, and reset the gap or replace with new plug as necessary. The original plug is an NGK BPR4ES. The Champion® equivalent of that NGK plug is RN14YC. The service replacement is Champion® RC14YC (Kohler part No. 66 132 01-S). Equivalent alternate brand plugs can also be used.

1. Before removing the spark plug, clean the area around the base of the plug to keep dirt and debris out of the engine.
2. Remove the plug and check its condition. Replace the plug if worn or reuse is questionable.

NOTE: Do not clean the spark plug in a machine using abrasive grit. Some grit could remain in the spark plug and enter the engine causing extensive wear and damage.

3. Check the gap using a wire feeler gauge. Adjust the gap to **0.76 mm (0.030 in.)** by carefully bending the ground electrode. See Figure 14.
4. Reinstall the spark plug into the cylinder head. Torque the spark plug to **20 N·m (14 ft. lb.)**.

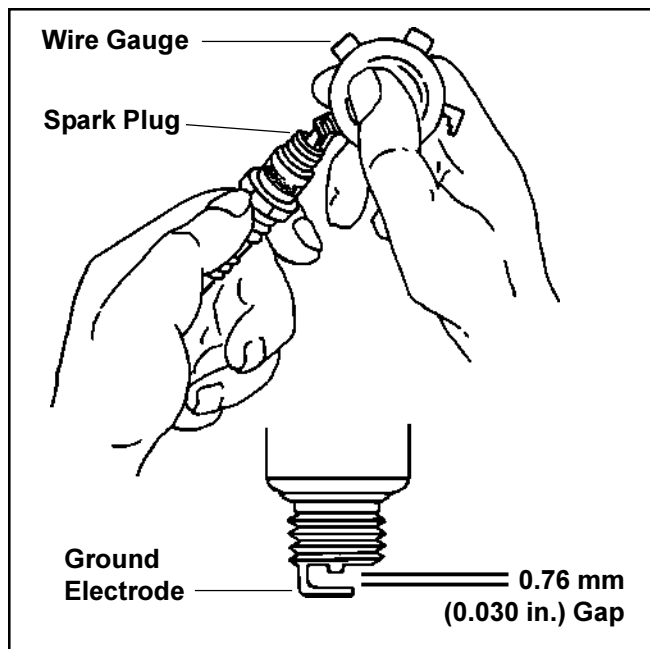


Figure 14. Servicing Spark Plug.

Battery Charging



WARNING: Explosive Gas!

Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present.

NOTE: Do not apply 12 volt DC to kill terminal of ignition module.

Fuel Valve

Engines are equipped with a fuel valve and integral screen filter located at the outlet of the fuel tank. See Figure 15. It controls and filters fuel flow from the tank to the carburetor.

Every 100 hours of operation clean filter screen and cup of any accumulated debris as follows:



CAUTION!

Never use or be near fuel or solvent while smoking or in the vicinity of an open flame.

1. Stop the engine.
2. Turn the fuel valve lever to “off.”
3. Remove the fuel valve cup and gasket.
4. Clean the cup with solvent and wipe it off.
5. Check the gasket, replace if damaged.
6. Reinstall the gasket and fuel valve cup.



CAUTION!

Be sure the fuel valve cup is tightened securely.

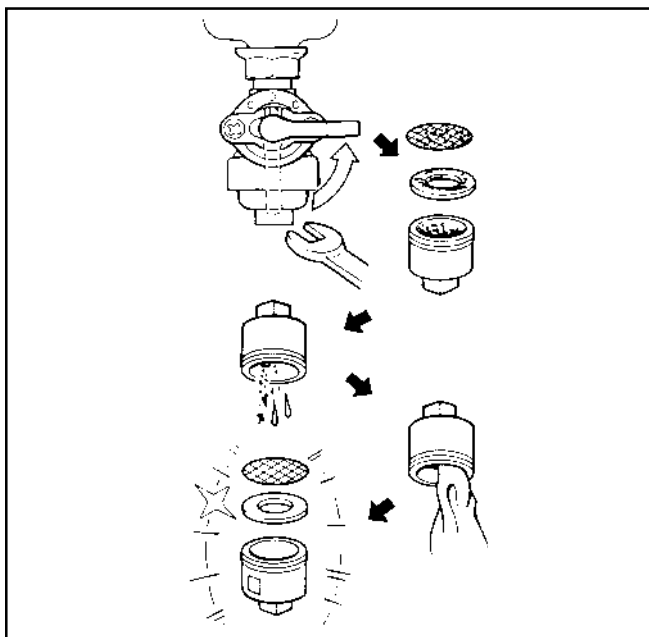


Figure 15.

Fuel Tank Filter

A serviceable fuel tank filter is located under the fuel tank cap, in the filler neck.

Daily or as required clean filter of any accumulation as follows:

1. Remove the fuel tank cap and filter.
2. Clean the filter with solvent, replace if damaged.
3. Wipe the filter and insert it.



CAUTION!

Be sure the tank cap is tightened securely.

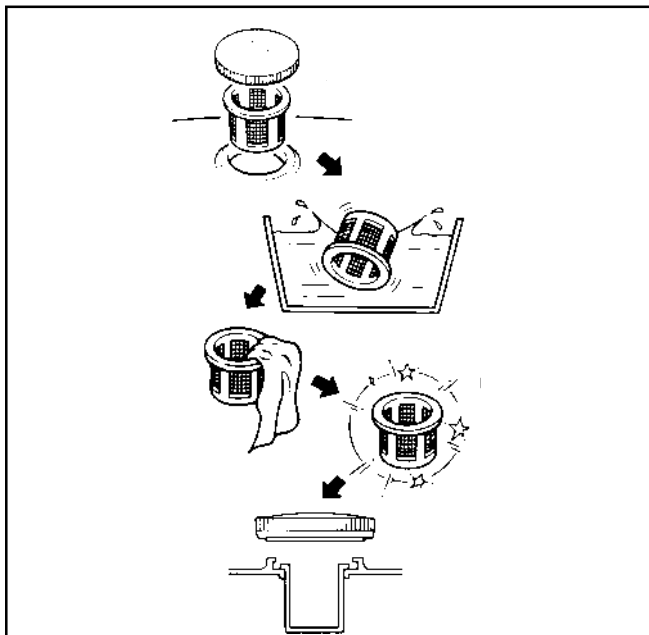


Figure 16.

Muffler Screen and Spark Arrestor

Engines are equipped with a muffler screen and spark arrestor for operational and environmental safety. One of two configurations will be used, determined by the engine model involved.

Every **100 hours** of operation, remove and clean or replace the muffler screen and/or spark arrestor following the instructions below.

Muffler Screen CS4,CS6



CAUTION!

The engine and muffler will be very hot after the engine has been run.

Avoid touching the engine and muffler while they are still hot, with any part of your body or clothing.

1. Remove the muffler screen.
2. Clean the carbon deposits out of the muffler screen using a wire brush.
3. Check the muffler screen, replace if damaged.
4. Install the muffler screen.

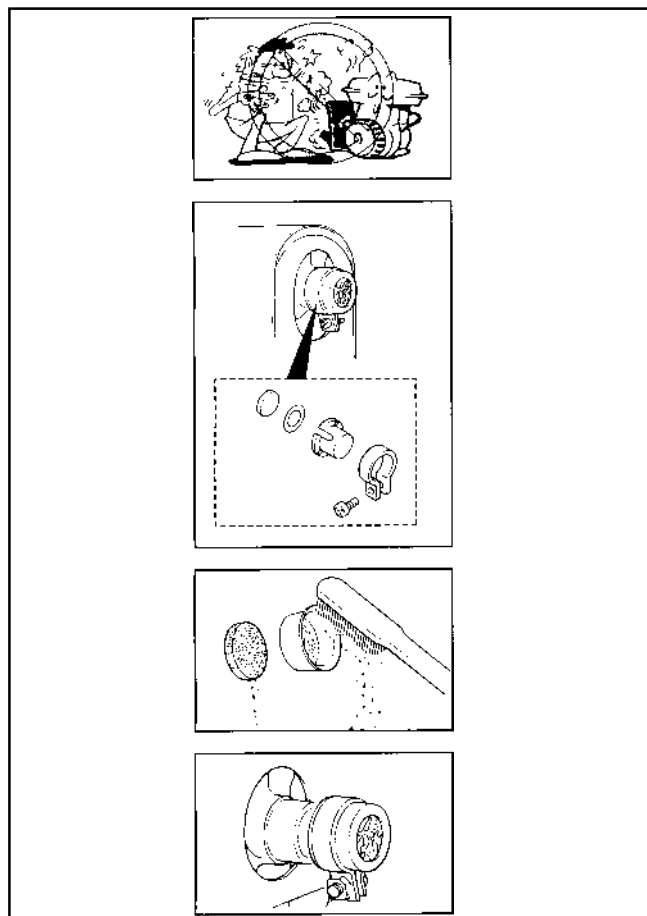


Figure 17. Muffler Screen.

Muffler Screen and Spark Arrestor CS8.5,CS10,CS12



CAUTION!

The engine and muffler will be very hot after the engine has been run. Avoid touching the engine and muffler while they are still hot, with any part of your body or clothing.

1. Remove the muffler screen.
2. Remove the spark arrestor using a flatblade screwdriver.
3. Clean the carbon deposits out of the muffler screen and spark arrestor using a wire brush.



CAUTION!

When cleaning, use the wire brush lightly to avoid damaging or scratching of the muffler screen and spark arrestor.

4. Check the muffler screen and spark arrestor, replace if damaged.
5. Install the spark arrestor and muffler screen.

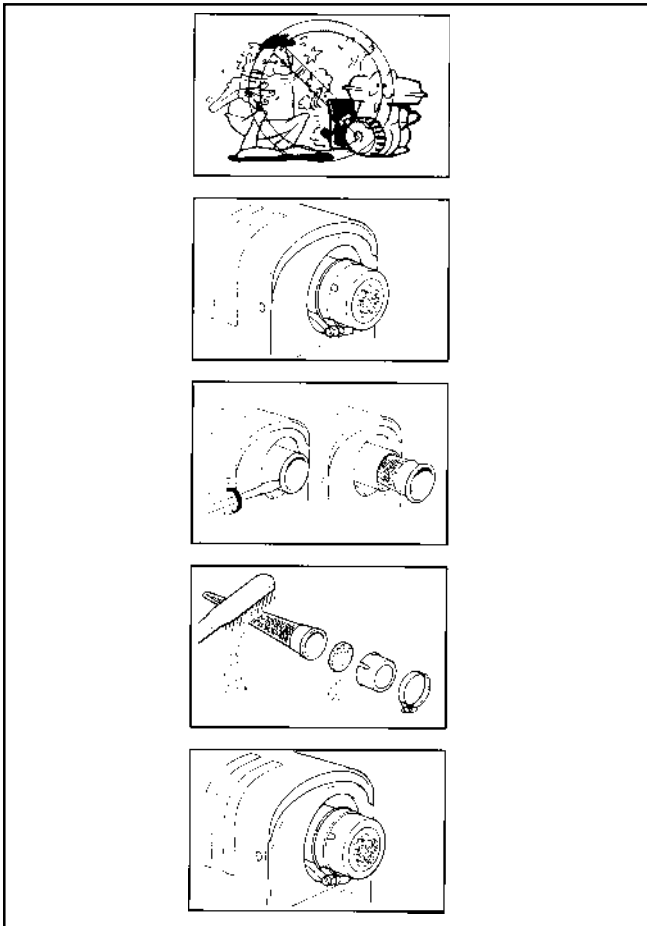


Figure 18. Muffler Screen and Spark Arrestor.

Carburetor Troubleshooting and Adjustments

NOTE: Carburetor adjustments should be made only after the engine has warmed up.

The carburetor is designed to deliver the correct fuel-to-air mixture to the engine under all operating conditions. The high idle mixture is set at the factory and cannot be adjusted. The low idle fuel adjusting needle is also set at the factory and has a limiting cap. It normally does not need adjustment.

If the engine is hard to start, runs roughly, or stalls at low idle speed, it may be necessary to adjust or service the carburetor.

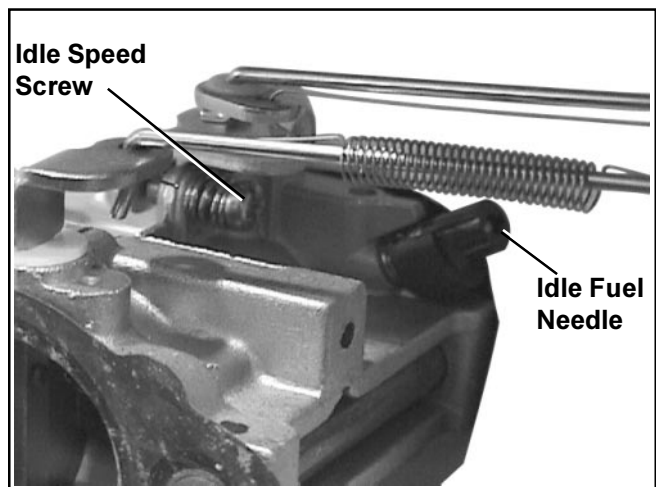


Figure 19. Carburetor.

Troubleshooting

If engine troubles are experienced that appear to be fuel system related, check the following areas before adjusting the carburetor.

- Make sure the fuel tank is filled with clean, fresh gasoline.
- Make sure the fuel tank cap vent is not blocked and that it is operating properly.
- Make sure the fuel shut-off valve is fully open.
- Make sure fuel shut-off valve strainer, and in-line fuel filter (if used) are clean and unobstructed. Clean or replace as necessary.

- Make sure fuel is reaching the carburetor. This includes checking the fuel lines and components for restrictions or problems. Replace as necessary.
- Make sure On-Off switch is functioning properly.
- Make sure the air cleaner element is clean and all air cleaner components are fastened securely.

If, after checking the items listed above, the engine is hard to start, runs roughly, or stalls at low idle speed, it may be necessary to adjust or service the carburetor.

Adjust Carburetor

NOTE: Certified engines have a limiter cap on the idle fuel adjusting needle. Adjustment can only be performed within the limits allowed by the cap.

1. Start the engine and run at half throttle for 5 to 10 minutes to warm up. The engine must be warm before making final settings.

2. **Low Idle Fuel Needle Setting:** Place the throttle into the “**idle**” or “**slow**” position. Turn the low idle fuel adjusting needle/cap in or out within adjustment range, to obtain the best low speed performance.
3. **Low Idle Speed Setting:** Place the throttle control into the “**idle**” or “**slow**” position. Set the low idle speed to **2000 RPM*** (± 150 RPM) by turning the low idle speed adjusting screw **in or out**. Check the speed using a tachometer.

*NOTE: The actual low idle speed depends on the application – refer to equipment manufacturer's recommendations. The recommended low isle speed for basic engines is 2000 RPM. To ensure best results when setting the low idle fuel needle, the low idle speed must not exceed 2000 RPM (± 150 RPM).

Troubleshooting

When troubles occur, be sure to check the simple causes which, at first, may seem too obvious to be considered. For example, a starting problem could be caused by an empty fuel tank. Some common causes of engine troubles are listed in the following table.

Do not attempt to service or replace major engine components, or any items that require special timing or adjustment procedures. Have your Kohler Engine Service Dealer do this work.

Possible Cause Problem	No Fuel	Improper Fuel	Dirt In Fuel Line	Dirty Grass Screen	Incorrect Oil Level	Engine Overloaded	Dirty Air Cleaner	Faulty Spark Plug
Will Not Start	•		•		•	•	•	•
Hard Starting	•	•	•			•	•	•
Stops Suddenly	•		•	•	•	•	•	
Lacks Power		•	•	•	•	•	•	•
Operates Erratically		•	•	•		•	•	•
Knocks or Pings		•		•		•		•
Skips or Misfires		•	•	•			•	•
Backfires			•			•	•	•
Overheats			•	•	•	•	•	
High Fuel Consumption							•	•

Storage

If the engine will be out of service for two months or more, use the following storage procedure:

1. Clean the exterior surfaces of the engine.
2. Change the oil while the engine is still warm from operation. See "Change Oil" on page 9.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration. If you choose to use a stabilizer, follow the manufacturers recommendations, and add the correct amount for the capacity of the fuel system. Fill the fuel tank with clean, fresh gasoline. Run the engine for 2-3 minutes to get stabilized fuel into the carburetor.

To empty the system, run the engine until the tank and system are empty.

4. Remove the spark plug. Add one tablespoon of engine oil into the spark plug hole. Install the plug, but do not connect the plug lead. Crank the engine two or three revolutions.
5. Remove the spark plug. Cover the spark plug hole with your thumb, and turn the engine over until the piston is at the top of its stroke. (Pressure against the thumb is greatest.) Reinstall the plug, but do not connect the plug lead.
6. Store the engine in a clean, dry place.

Parts Ordering

The engine Specification, Model, and Serial Numbers are required when ordering replacement parts from your Kohler Engine Service Dealer. These numbers are found on the identification plate which is affixed to the engine shrouding. Include letter suffixes if there are any. See "Engine Identification Numbers" on page 5.

Always insist on genuine Kohler parts. All genuine Kohler parts meet strict standards for fit, reliability, and performance.

Major Repair

Major repair information is available in Kohler Engine Service Manuals. However, major repair generally requires the attention of a trained mechanic and the use of special tools and equipment. Your Kohler Engine Service Dealer has the facilities, training, and genuine Kohler replacement parts necessary to perform this service. For Sales & Service assistance call 1-800-544-2444 (U.S. & Canada) or contact your Kohler Engine Dealer or Service Distributor, they're in the Yellow Pages under Engines-Gasoline.

Model Designation

Model CS4T for example: C designates Command engine, S designates slanted cylinder configuration, and 4 designates horsepower. A suffix letter designates a specific version as follows:

Suffix	Designates
T	Retractable Start
S	Electric Start
G	Tapered Crankshaft
P	Threaded Crankshaft
R	Gear Reduction (2:1 or 6:1)

Specifications

Model:	CS4	CS6	CS8.5	CS8.5	CS10	CS12
Spec. Number	90xxx	91xxx	95xxx	92xxx	93xxx	94xxx
Bore:	mm(in.) 56(2.20)	66(2.60)	75(2.95)	78(3.07)	78(3.07)	85(3.35)
Stroke:	mm(in.) 50(1.97)	50(1.97)	57(2.44)	63(2.48)	63(2.48)	63(2.48)
Displacement:	cm ³ (in. ³) 123(7.51)	171(10.44)	251(15.3)	301(18.37)	301(18.37)	357(21.79)
Power (@ 3600 RPM):	kW(HP) 2.98(4)	4.47(6*)	5.4(8.5*)	6.33(8.5*)	7.45(10*)	8.95(12*)
Max. Torque (@ 2400 RPM):	N·m(ft. lbs.) #7.5(5.5)	11.0(8.1)	16.5(12.2)	19.9(14.7)	19.9(14.7)	25.0(18.4)
Compression Ratio:	8.3:1	8.5:1	8.3:1	8.1:1	8.1:1	8.1:1
Weight:	kg(lbs.) 17.5(38.6)	17.5(38.6)	26(57.2)	31.9(70.5)	31.9(70.5)	31.9(70.5)
Oil Capacity:	L(U.S. qt.) 0.6(0.6)	0.6(0.6)	1.0(1.06)	1.1(1.2)	1.1(1.2)	1.1(1.2)
Fuel Tank Capacity:	L(U.S. qt.) 3.9(4.1)	3.9(4.1)	6.0(6.3)	6.9(7.3)	6.9(7.3)	6.9(7.3)
Exhaust Emission Control System:	EM					

*Horsepower ratings are established in accordance with Society of Automotive Engineers – Small Engine Test Code – J1349 GROSS. Kohler Co. reserves the right to change product specifications, design, and standard equipment without notice and without incurring obligation.

#Max. Torque obtained at engine speed of 2600 RPM.

LIMITED 2 YEAR COMMAND ENGINE WARRANTY

We warrant to the original consumer that each new COMMAND engine sold by us will be free from manufacturing defects in materials or workmanship in normal service for a period of two (2) years from date of purchase, provided it is operated and maintained in accordance with Kohler Co.'s instructions and manuals.

Our obligation under this warranty is expressly limited, at our option, to the replacement or repair at Kohler Co., Kohler, Wisconsin 53044, or at a service facility designated by us of such parts as inspection shall disclose to have been defective.

EXCLUSIONS:

This warranty does not apply to defects caused by casualty or unreasonable use, including faulty repairs by others and failure to provide reasonable and necessary maintenance.

The following items are not covered by this warranty:

Engine accessories such as fuel tanks, clutches, transmissions, power-drive assemblies, and batteries, unless supplied or installed by Kohler Co. These are subject to the warranties, if any, of their manufacturers.

WE SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, including but not limited to labor costs or transportation charges in connection with the repair or replacement of defective parts.

ANY IMPLIED OR STATUARY WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. We make no other express warranty, nor is any one authorized to make any in our behalf.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE:

Purchaser must bring the engine to an authorized Kohler service facility. For the facility nearest you, consult your Yellow Pages or write Kohler Co., Attn: Engine Warranty Service Dept., Kohler, Wisconsin, 53044.

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

**KOHLER CO.
FEDERAL AND CALIFORNIA EMISSION CONTROL SYSTEMS
LIMITED WARRANTY
SMALL OFF-ROAD ENGINES**

The U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Kohler Co. are pleased to explain the Federal and California Emission Control Systems Warranty on your small off-road equipment engine. For California, engines produced in 1995 and later must be designed, built and equipped to meet the state's stringent anti-smog standards. In other states, 1997 and later model year engines must be designed, built and equipped, at the time of sale, to meet the U.S. EPA regulations for small non-road engines. The engine must be free from defects in materials and workmanship which cause it to fail to conform with U.S. EPA standards for the first two years of engine use from the date of sale to the ultimate purchaser. Kohler Co. must warrant the emission control system on the engine for the period of time listed above, provided there has been no abuse, neglect or improper maintenance.

The emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included are the hoses, belts and connectors and other emission related assemblies.

Where a warrantable condition exists, Kohler Co. will repair the engine at no cost, including diagnosis (if the diagnostic work is performed at an authorized dealer), parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

Engines produced in 1995 or later are warranted for two years in California. In other states, 1997 and later model year engines are warranted for two years. If any emission related part on the engine is defective, the part will be repaired or replaced by Kohler Co. free of charge.

OWNER'S WARRANTY RESPONSIBILITIES

- (a) The engine owner is responsible for the performance of the required maintenance listed in the owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on the engine. But Kohler Co. cannot deny warranty solely for the lack of receipts or for your failure to assure that all scheduled maintenance was performed.
- (b) Be aware, however, that Kohler Co. may deny warranty coverage if the engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- (c) For warranty repairs, the engine must be presented to a Kohler Co. service center as soon as a problem exists. Call 1-800-544-2444 or access our web site at: www.kohlerengines.com, for the names of the nearest service centers. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding warranty rights and responsibilities, you should contact Kohler Co. at 1-920-457-4441 and ask for an Engine Service representative.

COVERAGE

Kohler Co. warrants to the ultimate purchaser and each subsequent purchaser that the engine will be designed, built and equipped, at the time of sale, to meet all applicable regulations. Kohler Co. also warrants to the initial purchaser and each subsequent purchaser, that the engine is free from defects in materials and workmanship which cause the engine to fail to conform with applicable regulations for a period of two years.

Engines produced in 1995 or later are warranted for two years in California. For 1997 and later model years, EPA requires manufacturers to warrant engines for two years in all other states. These warranty periods will begin on the date the engine is purchased by the initial purchaser. If any emission related part on the engine is defective, the part will be replaced by Kohler Co. at no cost to the owner. Kohler Co. is liable for damages to other engine components caused by the failure of a warranted part still under warranty.

Kohler Co. shall remedy warranty defects at any authorized Kohler Co. engine dealer or warranty station. Warranty repair work done at an authorized dealer or warranty station shall be free of charge to the owner if such work determines that a warranted part is defective.

Listed below are the parts covered by the Federal and California Emission Control Systems Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part. The warranted parts are:

- Oxygen sensor (if equipped)
- Intake manifold (if equipped)
- Exhaust manifold (if equipped)
- Catalytic muffler (if equipped)
- Fuel metering valve (if equipped)
- Spark advance module (if equipped)
- Crankcase breather
- Ignition module(s) with high tension lead
- Gaseous fuel regulator (if equipped)
- Electronic control unit (if equipped)
- Carburetor or fuel injection system
- Fuel lines (if equipped)
- Air filter, fuel filter, and spark plugs (only to first scheduled replacement point)

Continued on next page.

LIMITATIONS

This Emission Control Systems Warranty shall not cover any of the following:

- (a) repair or replacement required because of misuse or neglect, improper maintenance, repairs improperly performed or replacements not conforming to Kohler Co. specifications that adversely affect performance and/or durability and alterations or modifications not recommended or approved in writing by Kohler Co.,
- (b) replacement of parts and other services and adjustments necessary for required maintenance at and after the first scheduled replacement point,
- (c) consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.,
- (d) diagnosis and inspection fees that do not result in eligible warranty service being performed, and
- (e) any add-on or modified part, or malfunction of authorized parts due to the use of add-on or modified parts.

MAINTENANCE AND REPAIR REQUIREMENTS

The owner is responsible for the proper use and maintenance of the engine. Kohler Co. recommends that all receipts and records covering the performance of regular maintenance be retained in case questions arise. If the engine is resold during the warranty period, the maintenance records should be transferred to each subsequent owner. Kohler Co. reserves the right to deny warranty coverage if the engine has not been properly maintained; however, Kohler Co. may not deny warranty repairs solely because of the lack of repair maintenance or failure to keep maintenance records.

Normal maintenance, replacement or repair of emission control devices and systems may be performed by any repair establishment or individual; however, **warranty repairs must be performed by a Kohler authorized service center.** Any replacement part or service that is equivalent in performance and durability may be used in non-warranty maintenance or repairs, and shall not reduce the warranty obligations of the engine manufacturer.

FOR SALES AND SERVICE INFORMATION
IN U.S. AND CANADA, CALL
1-800-544-2444

KOHLERengines
BORN TO RUN[™]

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

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